

# Carrying on or giving in : processes of self-control and ego depletion

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Self-control, or self-regulation, refers to the extent to which an individual exerts control over his or her behaviour. Self-control has been defined as the override or inhibition of urges, behaviours or desires (Baumeister, Heatherton, & Tice, 1994; Shallice & Burgess, 1993) and can be regarded as a fundamental aspect of our daily life. On a daily basis we attempt to remain patient, suppress unwanted thoughts or resist temptations. Research has shown that being able to control oneself is a vital ability: good self-control abilities are associated with a range of positive life circumstances. For instance, people who possess relatively good self-control abilities have fewer conflicts with family members, higher self-esteem, lower chances of developing psychopathological problems and a better emotional life (Tangney, Baumeister, & Boone, 2004). In contrast, a lack of self-control has been found to be associated with various social and personal problems. Examples of such problems include obesity, unsafe sex, aggression and alcoholism (Baumeister, Heatherton, & Tice, 1994). In sum, these findings suggest that self-control can be defined as a key factor for a successful life.

Despite the importance of self-control, we often fail to control ourselves successfully. An important question in this respect concerns the reason for this failure. According to the strength model (Muraven, Tice, & Baumeister, 1998; Muraven & Baumeister, 2000), self-control failure arises as a direct consequence of limited energy. In this view, self-control requires energy of which people have only a limited amount available. After an initial act of self-control, the energy resource becomes temporarily depleted leaving the individual in a state of ego depletion. Consequently, a subsequent self-control attempt results in impaired performance because of a lack of energy or strength. Today, a relatively large amount of studies have indeed provided support for the strength model. Examples of findings are that the regulation of thoughts (i.e., suppressing a specific thought), altering one's emotional state (i.e., suppressing happy or sad emotions), and decision making involve self-control and that each of these activities results in impaired performance on a second self-control activity (see for an overview, Schmeichel, & Baumeister, 2004; Martijn, Alberts, & De Vries, 2006). So far, most studies on ego depletion have focused on demonstrating that different behaviours and outcome measures are influenced by ego depletion. Identifying these different outcome measures can be considered as a valuable and necessary, however, it does not provide more insight in the processes that underlie self-control and ego depletion. At this point, little is known about the nature of limited strength and the psychological process underlying this limitation remains unclear. This dissertation addressed this issue by attempting to provide more insight in the processes that underlie self-con-

trol performance and ego depletion. In doing so, we adopted a somewhat different perspective on self-control than the earlier mentioned strength model. Whereas the strength model mainly focuses on the limits of our self-control abilities, the current research was guided by a focus on the flexibility and relativity of regulatory capabilities. By focusing on possible ways to improve self-control and to circumvent ego depletion, it was argued that the strength model can be extended and room can be created for additional factors and processes that contribute to self-control performance.

The studies described in second chapter of this dissertation addressed the role of expectancies on self-control. Previous research findings suggest that self-control performance and the occurrence of ego depletion may be influenced by people's expectancies or schemata about self-control (Martijn, Tenbült, de Vries, Dreezens, & Merckelbach, 2002; Mukhopadhyay & Johar, 2005). The results of these studies imply that rather than the existence of a limited energy resource, the (naïve) expectancy that self-control is dependent on limited energy may explain self-control failure. After all, an individual who expects that self-control is a matter of limited energy is likely to be concerned with minimizing loss and the possible obstacles when exerting self-control. Such beliefs may cause one to quit self-control attempts sooner in order to minimize future failure. Holding and acting upon the belief that self-control is dependent on limited energy may therefore have serious implications for self-control performance and long term goal achievement. Three studies were conducted in order to gain more insight in the relation between self-control abilities and self-control related beliefs. More specifically, it was investigated whether there is a relation between the extent to which people believe that self-control is dependent on limited energy and their self-reported self-control abilities. To do so, a scale was developed to assess the extent to which participants believe that self-control is dependent on (limited) energy. In order to assess their self-control ability, participants completed the Self-control Scale (Tangney, Baumeister & Boone, 2004) (Study 1 and Study 2) and the Barratt Impulsiveness Scale (Barratt, 1994) (Study 3). The results showed that stronger energy related beliefs of self-control are related to worse self-reported self-control abilities (Study 1 and Study 2) as well as higher levels of overall impulsiveness (Study 3). In sum, these findings imply that when considering self-control failure (and the emergence of ego depletion), it may be worthwhile to consider the beliefs that people hold about the operation of self-control. Changing the belief that self-control strongly depends on energy may help to improve regulatory performance and circumvent the occurrence of ego depletion.

In Chapter 3, two studies were presented that addressed the issue of automaticity and self-control. More specifically, it was investigated whether the automatic emergence of ego depletion can be reduced or even eliminated by means of manipulations that are known to operate at the same automatic level as the occurrence of ego depletion itself. Whereas previous studies have demonstrated that self-control can be improved by means of explicit manipulations that require conscious attention or processing, the present experiments investigated whether the same effects can be accomplished by ways that do not require conscious attention or awareness. In two studies, the concept of persistence was unconsciously activated by means of different priming procedures. In Study 1, persistence was activated by means of a so-called Scrambled Sentence Task. Participants unscrambled 25 scrambled sentences of which 15 were related to persistence (e.g., “Peter keeps going”); the other 10 were neutral and were not related to persistence or self-control (e.g., “Sam buys bread”). In Study 2, a visual priming procedure was used to unconsciously activate persistence. While participants were performing a physical self-control task, the experimenter activated a screensaver which appeared on a computer screen. In the persistence prime condition, the screensaver depicted a winning young man in a business suit and a logo saying: “www.you-can-do-it.com, wallpapers and screensavers”. In the neutral prime condition, the screensaver showed a picture of a vase and a similar logo saying: “www.myscreensaver.com, wallpapers and screensavers”. In both studies it was found that depleted participants who were primed with persistence performed significantly better on a subsequent self-control task than depleted participants who were exposed to a neutral prime. Priming of persistence caused initially depleted participants to overcome ego depletion: their performance on a subsequent self-control task remained equal. In contrast, depleted participants who were exposed to the neutral prime displayed the classic ego depletion pattern: their performance decreased significantly. According to the strength model, self-control entails a conscious, active process. These findings, however, illustrate that self-control may also be guided by processes that operate outside awareness.

Research presented in Chapter 4 investigated the role of attentional processes in self-control. More specifically, this chapter addressed the effect of focusing attention on the control demanding situation (internal focus or cognitive association) versus directing attention away from the self-control action (external focus). In the present experiment, participants were asked to perform two successive physical self-control tasks. An internal focus was induced by asking participants to pay attention to their arm and hand muscles that were involved while they were performing the second physical

self-control task (internal focus or cognitive association). An external focus was induced by a distracting calculation task that was completed by participants during the exertion of the second physical self-control task. It was found that participants who were distracted by this calculation task (external focus) while exerting physical self-control outperformed both participants who focused their attention on the physical self-control task (internal focus) as well as control participants who did not receive any focus instructions. However, no significant difference in self-control performance was found between participants in the internal focus condition and control participants. With regard to the strength model, these findings suggest that attentional processes play an important role in the emergence of ego depletion and the failure of self-control. The finding that both people who focused attention internally as well as control participants exhibited a decline in performance, might imply that the occurrence of ego depletion is partly mediated by ineffective or suboptimal attentional processes. Directing attention to the self-control task (and the regulatory efforts that are associated with this task), may be a default process or natural tendency that emerges when people exert self-control. When this default attentional process is replaced by a process that is not preliminary concerned with regulatory efforts, no negative influence on self-control performance seems to occur.

In Chapter 5, the influence of attentional processes on self-control performance was further elaborated. Previous studies investigating the effects of self-focused attention on self-control performance have revealed a mixed pattern of findings; part of these studies highlight the self-control enhancing effect of self-focused attention, while others illustrate the regulatory downside of self-directed attention. The study presented in Chapter 5 was designed to provide more insight in these contradictory findings. It was reasoned that it is critical to differentiate between distinct *types* of self-focused attention. On the one hand, self-focused attention may involve the type of attention that was addressed in the study described in Chapter 4, namely attention directed towards the self-control action and internal sensations during this action (cognitive association). On the other hand, self-focus may also involve what is known under the term self-awareness. When self-focus concerns self-awareness, people become aware of the self's existence in the world and the salience of an internalized, social and/or situational standard is increased. The study in Chapter 5 attempted to establish a direct comparison between both types of self-focused attention. In order to isolate the effect of cognitive association, both types of self-focus were combined. More specifically, some participants were exposed to a manipulation that increased only self-

awareness, whereas others received a manipulation that increased both self-awareness and cognitive association. It was found that the type of self-focus determines the effect of self-focus on regulatory performance. Exposure to a self-awareness manipulation caused initially depleted participants to keep their physical self-control performances constant. This group outperformed both control participants as well as participants who were also exposed to the cognitive association manipulation by which attention was directed towards the self-control action. In line with the findings of Chapter 4, no improvement of self-control was observed when participants were highly self-aware but at the same time aware of internal states. In sum, the findings of Chapter 4 and 5 not only illustrate the importance of attentional processes in self-control and ego depletion but also demonstrate that the use of attentional strategies may help to overcome ego depletion.

In Chapter 6, self-control and ego depletion were presented in an applied context, namely criminality. It was argued that, in order to understand criminal behavior, one should not only focus on intentional crimes, which are characterized by organized or planned criminal activity, but should also consider the role of impulsive crimes. The latter involve a tendency to give in to violent or other disastrous impulses and strongly rely on momentary self-control. The results described in the present dissertation as well as other related findings were linked to criminality in order to gain more insight in the emergence of impulsive criminal behavior. Moreover, based on these findings, guidelines for preventing failure of impulse control and improvement of self-control performance were presented.

In Chapter 7, the main results of this thesis were summarized and discussed. The research presented in this dissertation has led to some new insights regarding the operation of self-control and ego depletion. Whereas the strength model regards self-control as a conscious, active process, the present findings illustrate that self-control may also be guided by processes that operate outside awareness. Unconscious activation of persistence can help people to overcome ego depletion and improve self-control performance. In addition, also attentional processes seem to play a key role in the emergence of ego depletion. The findings suggest that depletion emerges as a consequence of excessive focusing on one's regulatory efforts. When attention is directed away from the self-control action, ego depletion can be circumvented. Finally, the current studies on the role of expectancies suggest that beliefs on the operation of self-control may also underlie self-regulatory performance and ego depletion. Taken together, whereas the strength model stresses the limits of our capability to control ourselves, the present

findings rather illustrate the flexibility and relativity of these limits and suggest that that self-control and the emergence of ego depletion is more dynamic than initially suggested. The current findings favor a broader vision on self-control failure that is more in line with human complexity and flexibility.